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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,647	01/23/2004	Bill L. Looper	38190/270316	9390

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EXAMINER	
BAREFORD, KATHERINE A	
ART UNIT	PAPER NUMBER
1762	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/763,647	LOOPER ET AL.	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-16,18 and 20-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Claims 6, 17 and 19 are canceled

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment of December 14, 2006 has been received and entered. With the entry of the amendment claims 6, 17 and 19 are canceled, and claims 1-5, 7-16, 18 and 20-25 are pending for examination.

Claim Rejections - 35 USC § 112

2. The rejection of claims 1-16 and 18-25 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement is withdrawn due to applicant's amendments to clarify the dimensions of the relief angle in the amendment of December 14, 2006.

3. The rejection of claims 1-16 and 18-25 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention is withdrawn due to applicant's amendments to clarify the dimensions of the relief angle in the amendment of December 14, 2006.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-5, 7-16, 18 and 20-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art in view of Johnson (US 5893683), Shallenberger (US 5816754), David et al (US 2002/0168241) and Kottilingam et al (US 2005/0015980).

The admitted state of the prior art teaches, at page 1 of the specification, that it is common to repair surface defects in a variety of workpieces, such as the skin of an aircraft. To repair the defect in an aircraft skin, for example, the area of the defect can

be routed out, then the routed out area is grit blasted, then the area is filled using flame sprayed aluminum. Then, the coated area is sanded, and polished, to achieve the desired final surface finish.

Claims 8, 21: the workpiece can be an aircraft skin with a defect. Page 1.

Claims 9, 22: the portion of the workpiece that has bee routed can be grit blasted prior to flame spraying, which would remove foreign particles. Page 1.

Claims 10, 11, 23, 24 : the workpiece that has been flame sprayed can be sanded and then polished. Page 1.

The admitted state of the prior art teaches all the features of these claims except the routing method and apparatus, and resulting routed surface appearance.

Johnson teaches a router device that can be used to rout aircraft components. Column 1, lines 1-10. The router is provided with a cutter head 14, with, at the free end, a rounded corner and an axial depression in the form of a truncated cone. Column 2, lines 40-55 and figure 1. The router has a bit area with two cutting surfaces. Column 2, lines 45-55 and figure 2. To treat the substrate, the router can be plunged into the portion of the workpiece to be routed in a direction generally orthogonal to the workpiece to remove a portion of the workpiece as desired. Column 4, lines 20-35 and figure 5. The routed portion is defined by a sidewall extending generally orthogonal to the workpiece and a bottom surface. Column 4, lines 20-35 and figure 5. As shown by Johnson, the shape routed out corresponds to the shape of the cutting edge of the bit. Figure 5.

Shallenberger teaches a cutting system with cutting edges for drilling through metal. Figures 1-2 and column 3, lines 15-30. The cutting edge system uses angled cutting edges that are provided at a relatively shallow relief angle (8 degrees, for example). Figure 2 and column 4, line 60 through column 5, line 5. This facilitates penetration of the drill into the workpiece. Column 4, line 60 through column 5, line 5. As shown by Shallenberger, the shape routed out provides orthogonal sidewalls and a bottom surface that corresponds to the shape of the cutting edge of the drill system. See figure 2, figure 8 and figure 9A and column 2, lines 35-55. When using the angled cutting edges, therefore, a conical bottom surface defined by the shallow relief angle is produced. See figure 2, figure 8 and figure 9A and column 2, lines 35-55.

David teaches a router apparatus system for removing damaged portions of aircraft skin. Abstract and paragraph [0004]. David teaches to provide for control of router based on the drilling/milling tool sued, the material to be cut and its thickness, and the speed of movement of the router. Paragraph [0020]. The system can be controlled to provide precise depth of cuts into the skin. Paragraph [0021]. The depth of cut can be controlled to provide for vertical adjustments of micron sizing (0.001 inches) or finer to prevent damage. Paragraph [0030].

Kottlingham teaches a method of repairing a workpiece. Figures 1-3 and paragraph [0002]. The workpiece has a defect, such as a crack, and an area proximate the defect. Paragraph [0008]. A groove is formed on a portion of the workpiece including the defect such that the forming of the groove removes at least a portion of

the workpiece proximate to the defect. Figures 1-2 and paragraphs [0020]-[0021]. The groove can be formed by any suitable method, including hand grinding and conventional machining. Paragraph [0020]. Depending on the defect, a countersink or counterboring tool can also be used to form the "groove". Paragraph [0032]. It is desirable to provide that the vertical depth of the groove is conical shaped to promote better fusion, although other geometries can also be used. Paragraph [0021]. The groove is formed with dimensions selected to assist the repair process based on the size of the defect. Paragraph [0021]. After the groove is formed, the groove is filled with filler material by a thermal spray process such as micro plasma deposition. Paragraphs [0024] – [0027].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the admitted state of the prior art to use the routing method of Johnson with the expectation of providing a desirably routed surface, because the admitted state the prior art teaches that it is well known to rout aircraft skin components in a defect area to allow for corrective application of a new flame sprayed coating, and Johnson teaches a desirable method for routing aircraft components using a router with two cutting surfaces and where the router plunges into the substrate. It would further have been obvious to modify the admitted state of the prior art in view of Johnson to provide the cutting edges with a shallow relief angle as suggested by Shallenberger in order to improve penetration of the router as Shallenberger provides that when providing a routing type drilling into metal it is desirable to provide the

cutting edges with a shallow relief angle in order to improve penetration of the router, which further results in a conical shaped bottom surface and orthogonal side walls. It would further have been obvious to modify the admitted state of the prior art in view of Johnson and Shallenberger to using a precisely controlled microstop router system to perform the damage area removal and to provide a conical bottom surface when routing as suggested by David and Kottilingam, in order to provide an optimally repaired article, because the admitted state of the prior art in view of Johnson and Shallenberger teaches to use a router system to remove damaged aircraft skin for repair and the desire to use a shallow relief angle cutting edge, and Kottilingam further teaches to remove damaged area based on the specific size of the defect to be removed and that a conical depth (or bottom) of the groove formed is desirable for better fusion of the replacement material, and David teaches a router system for aircraft skin that can be controlled to remove precise areas desired. As to the use of countersink with the router, it is the Examiner's position that countersink is conventionally used with routers and David teaches to use various commercially available routers (see paragraph [0030]), thus indicating that desirable results would be expected when using such a router, and as well, Kottilingam notes that a countersink tool can be used for the damaged area removal. As to controlling the depth in predefined increments, this would be suggested when using the combination of references, because Johnson teaches to plunge in incrementally, and David teaches that depth can be controlled in 0.001 inch ranges, and the references suggest removing precisely controlled amounts. As to the diameter of

the router bit, the depth of the routing and the precise relief angle (between 0 and approximately 3 degrees) and corresponding conical angle of the bottom surface, it would have been obvious to one of ordinary skill to optimize these features, based on the specific router used, the material to be cut and its thickness, as the combination of prior art teaches to control the material removed based on the specific amount of damage present in the area to be repaired and to also base the operating conditions of the router on the specific router used, the material to be cut and its thickness. In regard to the precise relief angle, the cited prior art to Johnson and Shallenberger show that the specific relief angle used on the router bit is a result effective variable, as they show that when routing the shape of the bottom surface routed out corresponds to the shape of the cutting edge of the bit, and that different relief angles are known to be used, which correspondingly varies the amount of material removed and the shape of the material removed. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Response to Arguments

7. Applicant's arguments filed December 14, 2006 have been fully considered but they are not persuasive.

Applicant argues that none of the references discloses routing using the precise claimed relief angle, as Shallenberger discloses an angle of about 8 degrees, Johnson

discloses a flat bottom surface, Kottlilingham discloses a conical shaped groove, but no teaching as to a cutting edge and associated relief angle for forming the groove, David also does not disclose these features. Applicant further argues that while the Examiner takes the position that it would have been obvious to optimize the precise relief angle and corresponding conical angle of the bottom surface, they disagree, as the specification indicates that a shallow relief angle ensures that a minimal amount of material is removed, and Shallenberger simply discloses that a lead angle is used to cut the center portion of the bore before cutting the peripheral portion and to facilitate penetration into the workpiece, and in fact, a smaller relief angle would render initial penetration into the workpiece more difficult. As such, applicant argues, one of ordinary skill in the art would not look to Shallenberger, nor any of the remaining cited references to determine that a relief angle of between 0 and approximately 3 degrees would be desirable.

The Examiner has reviewed these arguments, however, the rejection is maintained. While Johnson and Shallenberger do not disclose the precise relief angles, they do show that when routing it is known to vary the relief angle used on the router bit, and show that the specific relief angle used on the router bit is a result effective variable, as they show that when routing the shape of the bottom surface routed out corresponds to the shape of the cutting edge of the bit, and that different relief angles are known to be used, which correspondingly varies the amount of material removed and the shape of the material removed. Moreover, the combination of the prior art

teaches to control the material removed based on the specific amount of damage present in the area to be repaired and to also base the operating conditions of the router on the specific router used, the material to be cut and its thickness. Kottlingham, for example, teaches to remove damaged area based on the specific size of the defect to be removed and that a conical depth (or bottom) of the groove formed is desirable for better fusion. As a result, it would have been obvious to optimize the shape of the ~~shape of the~~ relief angle to optimize the shape to be provided for removal of the damaged material and optimum shape of the routed out area to be filled. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). While Shallenberger may disclose that a lead angle is used to cut the center portion of the bore before cutting the peripheral portion and to facilitate penetration into the workpiece, the combination of the references, as discussed above, also indicates that the relief angle is a result effective variable as to the shape of the resulting routed out area of the substrate, and the suggestion would be to control this variable. Applicant has made no showing of unexpected results from using the specifically claimed relief angle range.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KATHERINE BAREFORD
PRIMARY EXAMINER